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NEW SPECIES AND NEW RECORDS OF COLOMBIAN PALMS

Nuevas especies y nuevos registros de palmas colombianas

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ABSTRACT

Four new species of palms from Colombia, *Aiphanes graminifolia*, *Bactris rostrata*, *Geonoma santanderensis* and *Geonoma wilsoni*, are described and illustrated. Three species, *Attalea cohune*, *A. phalerata* and *A. plowmanii* are recorded for the first time in Colombia; the name *Attalea plowmanii* is a new combination based on *Scheelea plowmanii*. Another species, *Aiphanes simplex*, is recorded from the Eastern Cordillera of Colombia.

Key words. *Aiphanes, Attalea, Bactris*, Colombia, *Geonoma*, Palmae, Taxonomía.

RESUMEN

Se describen e ilustran cuatro nuevas especies de palmas de Colombia, *Aiphanes graminifolia, Bactris rostrata, Geonoma santanderensis* y *Geonoma wilsoni*. Otras tres especies, *Attalea cohune, A. phalerata* y *A. plowmanii*, se registran por primera vez en Colombia; el nombre *Attalea plowmanii* es una nueva combinación basada en *Scheelea plowmanii*. Otra especie, *Aiphanes simplex*, se registra en la Cordillera Oriental de Colombia.

Palabras clave. *Aiphanes, Attalea, Bactris*, Colombia, *Geonoma*, Palmae, Taxonomy.

INTRODUCTION

Palm exploration in Colombia during the last few years has resulted in the discovery of four undescribed species of palms and in the finding of three species of *Attalea* not previously recorded in Colombia. Additionally *Aiphanes simplex*, a species so far known only from the basin of the Cauca river and adjacent areas on the Western Cordillera, has been found on both slopes of the Eastern Cordillera.

Aiphanes graminifolia Galeano & R. Bernal, sp. nov. (Fig. 1).

Type. COLOMBIA. **Santander**: Municipio de Suaita, Inspección San José de Suaita, vereda Canelones, ca. 6º 10'N, 73º 27', ca. 1800 m, 31 Jul 2001, *G. Galeano, J. Betancur, N. Castaño, L. Clavijo & N. García 7007* (holotype, COL; isotypes, AAU, HUA, K, MO, NY, UIS).

Diagnosis. Ab omnibus speciebus generis foliis pinnis delicatis angustissimisque, atque fructibus parvis differt.

Description. Cespitose, with 2-15 sparsely arranged stems, up to 5 m long and 2 cm in diameter, erect or diversely flexuous, light brown, armed with dark brown to black spines up to 4 cm long. Leaves 4-6 polistichous; sheath + petiole at least 32-37 cm long, densely armed with short spinules and dark brown, up to 7 cm long spines; petiole 9.6-24 cm long, sparsely covered with yellowish-brown spinules to 0.5 cm long, and few flattened, brown, to 3 cm long spines; rachis 81-89 cm long, green, spinulose like the petiole, provided abaxially near base with a few scattered, flattened, up to 3 cm long, dark-brown spines; pinnae 30-32 on each side, inserted in lax groups of 2-6 separated by up to 7 cm, arranged in slightly different planes, narrowly linear to linear-lanceolate, 23-36 times as long as wide, the apex bifid and strongly unequal, the distal margin projected into a finger-like, 0.3-4 cm long acumen, which is longer in the middle pinnae and becomes progressively shorter in apical pinnae, or the wider pinnae with the apex truncately praemorse with up to three tips, the apical and subapical pinnae truncately praemorse, all pinnae membranaceous, glabrous on both sides, except for a few short spinules near base on both sides, margins lined with yellowish to brown, less than 0.5 mm spinules; midrid adaxially with short spinules to 0.3 mm long, abaxially without spinules; basal pinnae 23-35 x 0.3-1 cm; middle pinnae 27-55 x 1-1.5 cm; apical pinnae 16.5-20 x 1.3-1.5 cm. Inflorescence interfoliar, arched, 1-2 at different developmental stages, branched to 1 order; prophyll 15-16.5 x 0.5-0.7 cm, glabrous or with brownish, appressed scales and with a few flattened brownish spinules less than 1 mm long; peduncular bract 45-50 cm long, glabrous and unarmed; peduncle 71-73 cm long, purplish-green when fresh, sparsely covered with appressed brownish scales, unarmed or with a few minute spinules toward the apex; rachis 8.5-22 cm long, brownish in fresh, sparsely covered like the rachillae with minute, curved, sometimes retrorse, brownish, less than 0.1 mm long spinules; rachillae 7-12; basal rachillae 11.5-12.4 cm long, with a basal flowerless portion 1.5-2 cm long, with triads for 1/3-1/2 of the remaining length, in this part ca. 2-3 mm diameter at anthesis, distally ca. 0.5 mm diameter, with staminate flowers solitary or in dyads; apical rachillae 7.5-9 cm long, with staminate flowers only; flower groups slightly sunken into the rachillae; triads subtended by an ovate-triangular, acuminate, to 1-2 mm long bract; solitary staminate flowers or dyads subtended by a triangular, ca. 0.5 mm long bract. Staminate flowers 1.5-2 mm long; sepals imbricate, shortly connate at base, ovate acuminate, carinate, 1-1.5 mm long; petals ovate, acute at apex, nearly free, ca. 1-1.2 mm long; filaments 0.1-0.3 mm; anthers almost square, 0.4-0.5 mm wide; pistillode minute. Pistillate flowers 3.5-5 mm long; sepals imbricate, widely ovate, 2.5-3.5 mm long; petals 4-4.5 mm long, connate for 1/3 of their length, valvate and acute distally; staminodial cup ca. 3-3.5 mm high; pistil ovoid, 2-2.5 x 2 mm, glabrous and smooth. Fruits globose, green and purplish toward the apex when inmature, ca. 5 mm diameter; endocarp turbinate-subglobose, with the germinative pores at the broadest portion, sparsely reticulate-foveolate toward the apex, where it is almost plane.

Distribution and habitat. *Aiphanes graminifolia* is known only from the type locality, a forested area on the western side of the Eastern Cordillera. The area has some calcareous basement and the forest corresponds to very wet premontane forest (bosque muy húmedo premontano), in Holdridge´s life zone system (IGAC 1977), and has a closed canopy 30-35 m high, dominated by trees of the Lauraceae, Sapotaceae and Euphorbiaceae; the understory is dominated by Araceae and small shrubs of Melastomataceae and Rubiaceae. *Aiphanes graminifolia* seems to be a rare species, since it was found only in one small area of the forest. This region includes one of the few premontane forests still preserved in Colombia.

Vernacular name. Macanillo. No uses have been recorded.

Etymology. The name *graminifolia* alludes to the general aspect of the palm leaves, with long, soft, linear pinnae, which at first sight evoke a large grass.

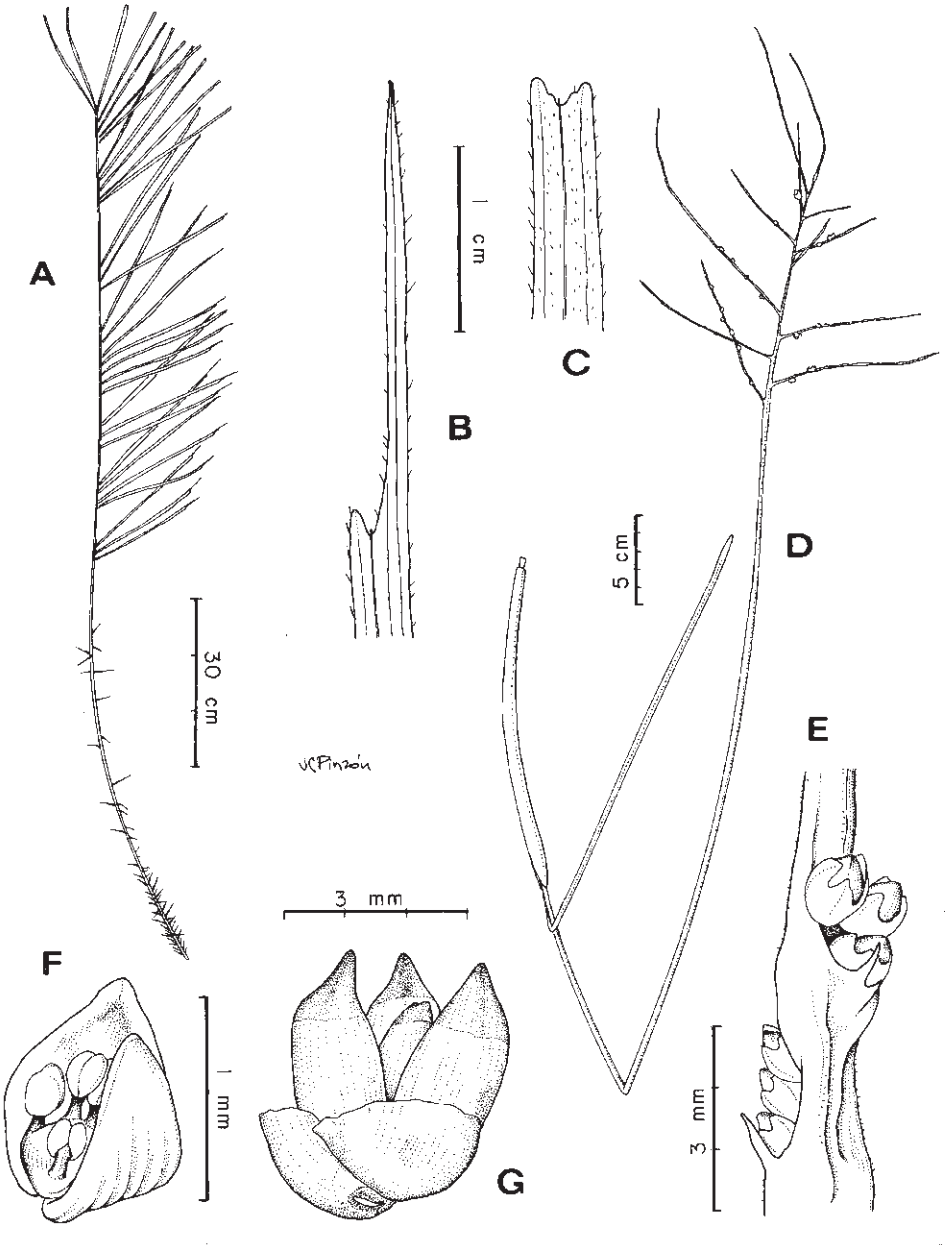
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Figure 1. *Aiphanes graminifolia* Galeano & R. Bernal. A. Leaf. B. Apex of a middle pinnae. C. Apex of an apical pinnae. D. Inflorescence. E. Detail of rachilla. F. Staminate flower. G. Pistilate flower (From *Galeano et al. 7007*).

Comments. *Aiphanes graminifolia* is unmistakable in its delicate habitat, its linear and extremely narrow pinnae (23-36 times as long as wide), with bifid and strongly inaequilateral apex, a combination of characters not found in any other species in the genus. The most similar species is *Aiphanes lindeniana* (H. Wendl.) H. Wendl., a widespread and variable species (Borschenius & Bernal 1996) which differs in its larger size, its usually distichous leaves, its cuneate to linear pinnae, the narrowest ones only 11 times as long as wide, with truncate and obliquely praemorse apex, its larger inflorescence, with more numerous (16-68 vs. 7-12) and longer (16-42 vs. 7.5-12.4 cm long) rachillae, and its larger fruits (14-16 vs. 5 mm in diameter). However, a close relationship between both species is not evident.

Bactris rostrata Galeano & R. Bernal, sp. nov. (Fig. 2).

Type. COLOMBIA. **Chocó**: 37 km NW of Las Animas, Panamerican Road, 5º 17' N, 77º 23' W, 100 m, 10 Jul 1986, *R. Bernal, G. Galeano & R. Sanders* (holotype, COL; isotypes, AAU, FTG, HUA, MO, NY).

Diagnosis. Ab omnibus speciebus generis fructibus magnis, fortiter rostratis, foliisque simplicibus valde distincta.

Description. Cespitose, with 11 stems up 6 m tall, 2.5-4 cm in diameter, brown; internodes 7-15 cm long, with black, up to 4 cm long, sparsely arranged spines. Leaves 8-14, simple; sheath 56-60 cm long, covered with thick, cottony, light brown to whitish, more or less deciduous indumentum, and with many short and flexible spinules and sparse, flattened, black to dark brown, up to 3 cm long spines, toward apex with spinules and spines only adaxially; petiole 11-25 cm long, canaliculate adaxially, rounded abaxially, green when fresh, with an indumentum like that of the sheath, basally with spinules and spines like those of the sheath, unarmed toward apex; rachis 94-104 cm long, unarmed, with tomentum like that of the sheath; blade oblong-obovate, 127-158 x 66-72 cm, acute at the base, olive brown when dry, glabrous adaxially, minutely spinulose abaxially, 34-35 primary veins on each side, prominent adaxially. Inflorescence and infructescence interfoliar; peduncle 26-32 cm long, 6-8 mm diameter at the apex, recurved, reddish-brown, densely covered with thick indumentum of elongate, brown and yellowish trichomes and with sparse, ca. 1 mm long spinules; prophyll 22-27 x 2-2.5 cm, unarmed, densely covered with cottony, yellowish-white tomentum; peduncular bract 45-48 cm long, covered with an indumentum of white scales and with many delicate, brown and yellowish, up to 1.5 cm long spines; rachis 6-7.5 cm long, with a thick, more or less deciduous indumentum of minute, globose, yellowish trichomes which have moniliform and dark brown pedicels; rachillae 10-12, 9-14 cm long, ca. 3 mm diameter in fruit, with indumentum like that of the rachis; triads irregularly arranged among solitary and paired staminate flowers. Fruits ellipsoid to obovoid, strongly rostrate, 3.5-4.0 cm long, including a 0.7-0.9 cm long rostrum, 2.0-2.4 cm diameter, reddish-brown, yellowish-green toward base and apex, the surface scabrous due to the reduced spinules that appear as deciduous reddish-brown crustose scales, particularly abundant toward the apex; mesocarp juicy, fibrous, white, acid; endocarp subglobose to slightly obovoid, ca. 2 cm diameter, with thin, flexuous, appressed, free fibers with juice sacs; fruit perianth prominent, reaching almost ½ of the fruit lenght; calyx 0.8-1 cm long, deeply and irregularly lobed, glabrous and without spines, the margins dark; corolla 1.5-1.8 cm long, regular and shallowly lobed, toward the base with the remains of crustose and pedicellate scales, toward the apex with appresed, flattened, slender, black, 1-2 mm long spinules; inner surface of the corolla with pedicellate, dark scales; staminodial ring absent.

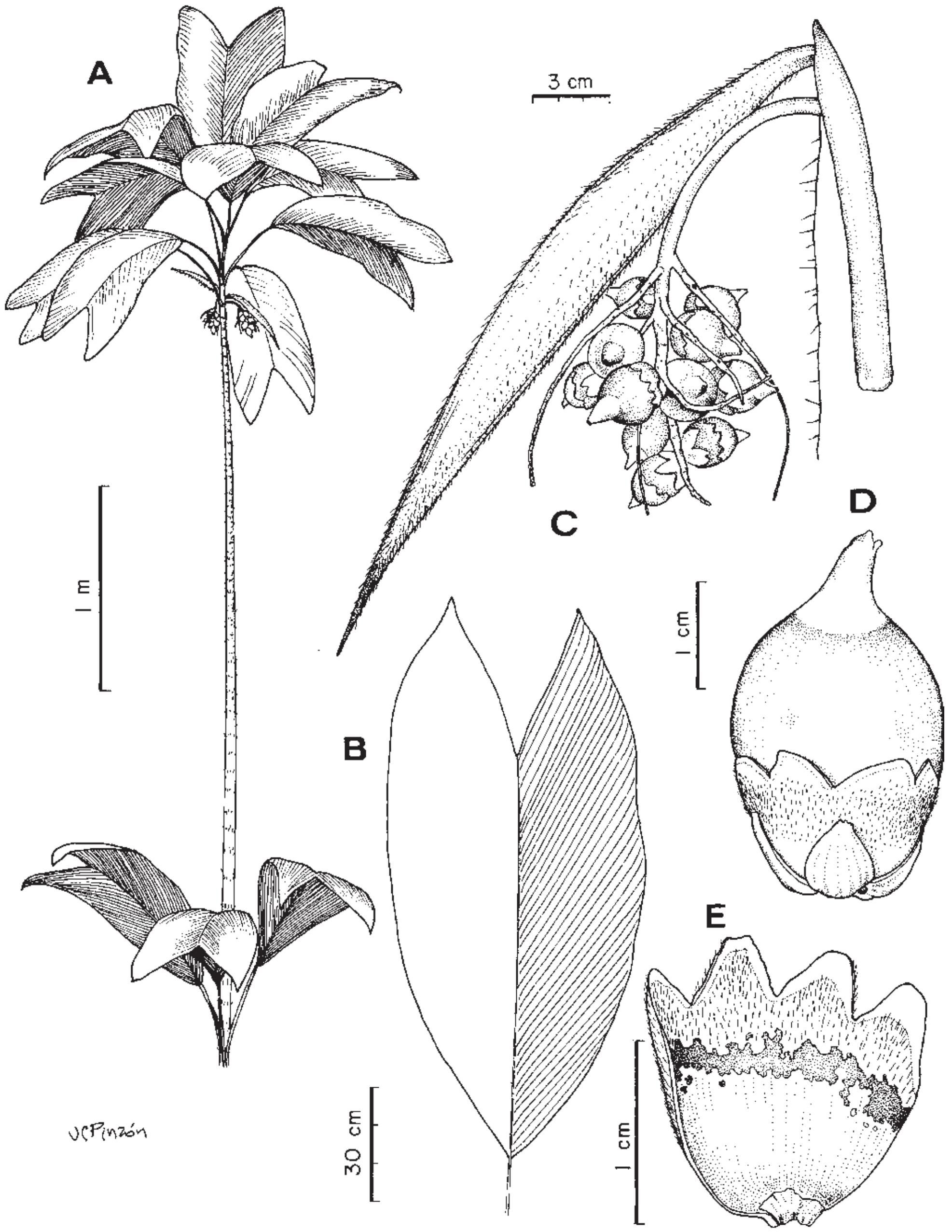
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Figure 2. *Bactris rostrata* Galeano & R. Bernal. A. Habit. B. Leaf. C. Infructescence. D. Fruit. E. Fruiting corolla, inner surface (From *Bernal et al. 1103*).

Distribution and habitat. Known only from the type locality, at the center of the Chocó Department, at about 100 m elevation. This area has an annual rainfall close to 10 000 mm (Eslava Ramírez 1994), and has been classified as *bosque pluvial tropical* in Holdridge's life zone system (IGAC 1977).

Common name. Chacarrá.

Etymology. The epiteth *rostrata* alludes to the long beak (rostrum) of the fruits, the longest of any species of *Bactris*.

Comments. *Bactris rostrata* is characterized by its large, strongly rostrate fruits; the rostrum is apparently the largest of any *Bactris* species. The species belongs to the "purple-fruited group" (Henderson 2000) an informal arrangement of 28 species characterized by the lack of a staminodial ring and by the presence of juice sacs attached to the mesocarp fibers. The group includes middle-sized palms over 2 m tall, with stems more than 1 cm diameter, and with branched inflorescences, usually with more than 7 rachillae. Fruits are diverse in texture and color, but they are never red. Within this group, *B. rostrata* has similarities with *B. coloniata* L. H. Bailey, *B. macroacantha* Mart., *B. setiflora* Burret, *B. turbinocarpa* Barb. Rodr., *B. fissifrons* Mart., and *B. corossilla* H. Karst., which also have strongly rostrate fruits. In particular, the first three of these species have the greatest similarities. Table 1 summarizes the differences between *B. rostrata* and these three species.

Due to its general resemblance to *B. coloniata*, it might be thought that *B. rostrata* is a hybrid of that species with any of the several *Bactris* species that grow in the area (*B. barronis* L. H. Bailey, *B. brongniartii* Mart., *B. coloradonis* L. H. Bailey, *B. gasipaes* Kunth, *B. hondurensis* Standl., *B. maraja* Mart., *B. setulosa* H. Karst.). However, there are no traits in the new species that suggest introgression of any of these species. The only one of them that belongs to the "purple-fruited group" is *B. maraja*, which has small, purplish-black, shortly rostrate fruits, and white spines on the sheath and the petiole.

Geonoma santanderensis Galeano & R. Bernal, sp. nov. (Fig. 3).

Type. COLOMBIA. **Santander**: Suaita, San José de Suaita, ca. 6º 10'N, 73º 27', 1700-1900 m, 30 Jul 2001, *G. Galeano , J. Betancur, N. Castaño, L. Clavijo & N. García 6884* (holotype, COL; isotypes, HUA, NY, UIS).

Diagnosis. *Geonomae monospathae* affinis, sed bractea peduncularis prophyllo fere aequilonga, spica longioris atque fructibus ellipsoideis, apice acutis, distincta.

Description. Caespitose, with 2-4 stems 1-1.5 m tall, 0.8-1 cm diameter, light brown, conspicuously ringed. Leaves 6-8; sheath 15-18 cm long, fibrous on the margins, densely covered with reddish-brown to dark brown scales; petiole 16-26 cm long, ca. 3-4 mm wide at the apex, covered with a thin indumentum of deciduous brown scales; blade pinnate, 20-36 x 15-16.5 cm; rachis 18-25 cm long, sparsely covered with thin, dark, deciduous scales; pinnae 3-9 on each side, narrow intermixed with wide, straight to sigmoid, long-acuminate; basal pinnae 8-12 cm long, middle pinnae 8-14 cm long, the apical ones 8-13 cm long; primary veins 22-24 on each side, emerging at 40-55° from the rachis, slightly pominent and glabrous above, prominent, and with brown scales below; only one secondary vein between two primary veins, flattened and inconspicuous above, prominent and with brown scales below. Inflorescence spicate, erect, interfoliar to infrafoliar in fruit, up to 6-8 nodes below the oldest leaf; prophyll 4-8 cm long, 4-6 mm wide, papiraceous, striate, with thin, deciduous indumentum of reddish-brown scales; peduncular bract inserted 4-10

Table 1. Morphological differences between *Bactris rostrata* and the most similar species

Character	***Bactris rostrata***	***Bactris coloniata***	***Bactris macroacantha***	***Bactris setiflora***
Leaf	simple	pinnate (rarely simple)	pinnate	pinnate
Indumentum on sheath, petiole and rachis	deciduous yellowish-white tomentum	persistent reddish-brown tomentum	persistent reddish-brown tomentum	persistent brown tomentum
Abaxial surface of the leaf	spinulose	glabrous	glabrous	spinulose
Peduncle	with elongate (hair-like) trichomes and spinules	with moniliform trichomes, without spinules	with or without spines	spinulose
Rachillae at anthesis	densely covered with moniliform trichomes	densely covered with moniliform trichomes	densely covered with moniliform trichomes	spinulose
Fruit	ellipsoid to slightly obovoid, to 4 cm long, rostrate in 7-9 mm.	broadly obovoid, to 3 cm long, rostrate in 3-5 mm.	broadly obovoid, to 3.3 cm long, rostrate in 3-5 mm	obovoid, to 3 cm long, rostrate in 2-3 mm
Fruiting perianth	calyx 0.8-1 cm long, deeply lobed, glabrous, without spinules; corolla 1.5-1.8 cm long, shortly lobed, with spinules and scales	calyx 0.2-0.3 (-0.5) cm long, crenulate, glabrous, without spinules; corolla 0.4-0.5 (1.0) cm long, crenulate, spinulose	calyx 0.3-0.4 cm, shortly lobed, setulose; corolla 0.7-0.9 cm long, shortly lobed, spinulose	calyx 0.2-0.4 cm long, irregularly lobed; corolla 0.5-0.8 cm long, lobed, spinulose
Inner surface of the fruiting corolla	with scaly indumentum and spinules like the outer side	glabrous	glabrous	glabrous
Endocarp	subglobose	turbinate	turbinate to oblong	obovoid
Distribution	Chocó, Colombia	Eastern Panama to northweastern Colombia and Ecuador; Peruvian Amazon	Northwestern Amazon region in Colombia, Peru and Brazil	Amazonian slopes of the Andes in Ecuador

mm above the insertion of the prophyll, slightly shorter than it and almost completely covered by it, 4-7 cm long, 4-6 mm wide, membranaceous and fibrous; peduncle 5-7 cm long, 1-2 mm diameter at the apex, minutely verrucose and with deciduous, scattered, reddish-brown scales; spike 7-11 cm long, 2.5-3 mm diameter in flower, up to 4 mm diameter in fruit, cylindrical, not narrowed between the flowerpits, the apex with an acumen ca. 5 mm long, minutely verrucose, covered with reddish and furfuraceous trichomes, green in flower, reddish in fruit; pits bilabiate, in 5 spirally arranged rows, the pits in each row separated 3-4 mm; upper lip short but projected and conspicuous; lower lip projected and bifid. Staminate flowers 4-5 mm long, whitish; sepals 3-3.5 mm long, lanceolate-elliptic, acute, carinate; petals 3.5-3.6 x ca.1 mm, connate at base for ca. 1.5 mm, lanceolate, acute; filaments connate in a tube ca. 2 mm long; anthers strongly reflexed from the filaments. Pistillate flowers elliptic-oblong, 4-4.5 mm long; sepals elliptic-lanceolate, obtuse, thick; petals 3.5 mm long, connate for 2 mm at base; staminodial ring shortly crenulate; pistil oblong-elliptic. Fruits ellipsoid, acute at apex, 8-9 x 4-5 mm, black at maturity, minutely striate-verrucose.

Distribution and habitat. Known only from the type locality on the northwestern side of the Eastern Cordillera in Colombia, an area classified as very wet premontane forest (bosque muy húmedo premontano) in Holdridge´s life zone system (IGAC 1977). This is the same forest area where *Aiphanes graminifolia* (described above) was found. In contrast with the latter, *G. santanderensis* is a very common species in the forest understory.

Common name. San Pabla; cubarra de Castilla. No uses have been recorded.

Etymology. This species is named after the Deparment of Santander, where it was discovered.

Comments. This new species cannot be keyed out in Wessels Boer's (1968) treatment of the geonomoid palms. It shows some resemblance in morphology and in its high elevation habitat, to *G. monospatha*, recently described from Panama (de Nevers & Grayum 1998). Nevertheless, *G. monospatha* has a very small, almost absent peduncular bract (a character shared only with *G. stricta*), whereas *G. santanderensis* has a well developed peduncular bract, similar to the prophyll and almost enclosed by it (as, e. g., in *G. arundinacea* and *G. aspidiifolia*). Also, *Geonoma monospatha* has leaves that are proportionally longer (2.5-3.1 times as long as wide vs. < 2.5 times), shorter spikes (2-4 vs. 7-11 cm), petals and sepals twice as short, and smaller fruits (4.8-5.2 vs. 8-9 mm long) that are globose (vs. ellipsoid) and rounded at apex (vs. acute).

Additional specimens examined. COLOMBIA. **Santander**: Suaita, San José de Suaita, ca. 6º 10'N, 73º 27', 1700-1900 m, 28 Jul 2001, *G. Galeano et al. 6811* (AAU, COL, K, MO).

Geonoma wilsoni Galeano & R. Bernal, sp. nov. (Fig. 4-5)

Type. COLOMBIA. **Caquetá**: Municipio de Florencia, Florencia-Suaza road, km 35, vereda Las Brisas, 1° 44'N, 75° 44'W, 1600-1700 m, 8 Aug 2001, *R. Bernal & W. Malagón 2900* (holotype, COL; isotypes, AAU, COAH, HUA, MO, NY).

Diagnosis. Ab omnibus speciebus generis foliis lamina simplicis vel pinnae in quoque latere duabus, rachidis perbrevis, apice profunde bifida, atque inflorescentia simplex differt.

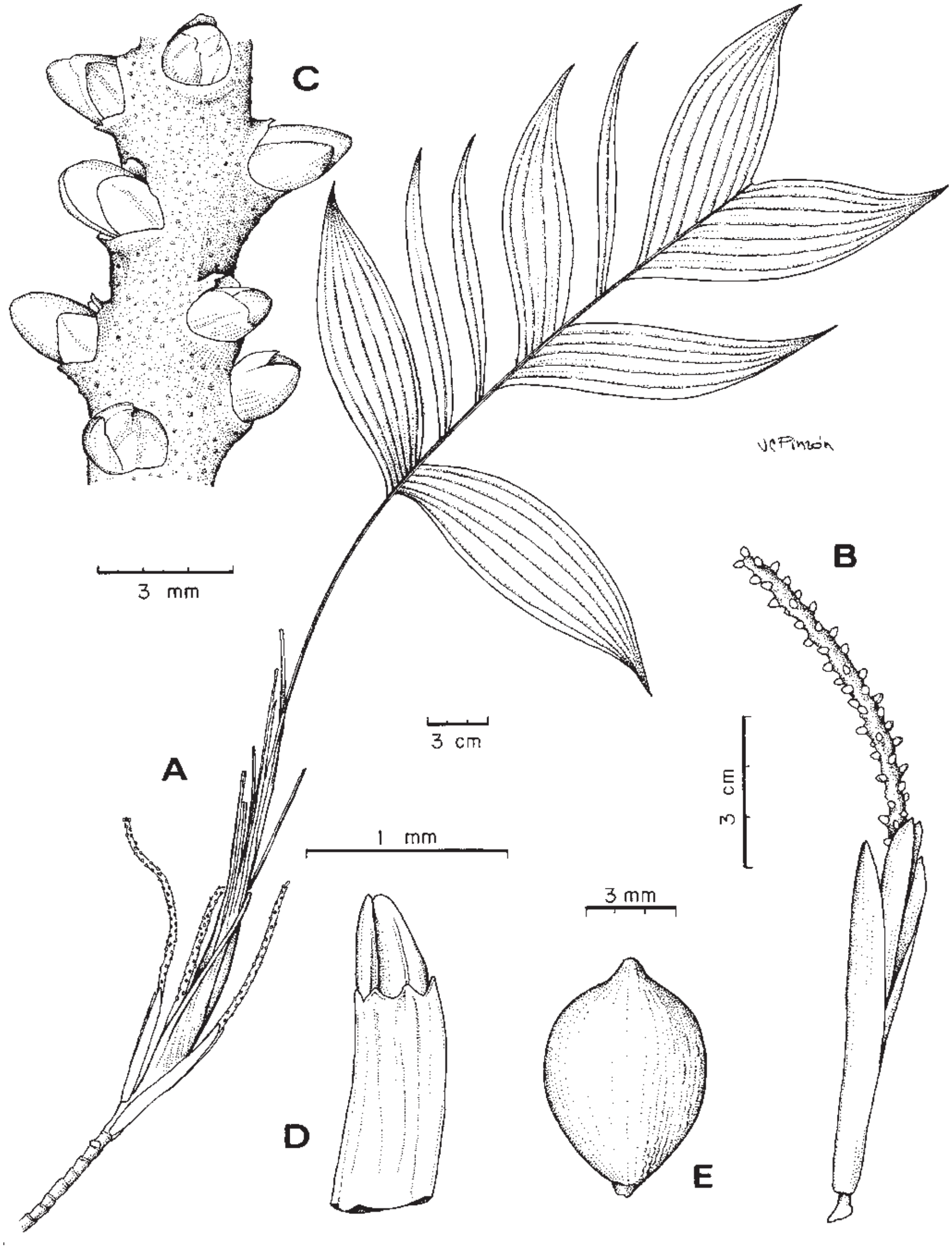
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Figure 3. *Geonoma santanderensis* Galeano & R. Bernal. A. Stem with leaf and inflorescences B. Inflorescence. C. Detail of rachilla. D. Staminodial tube. E. Fruit (From *Galeano et al. 6884*).

Stem solitary, 0.2-1 m tall, 8-10 mm diameter, grayish-green to yellowish, internodes ca. 1 cm. Leaves 14-15, arranged in an hemispheric crown, simple and bifid or with two pinnae per side; sheath 5-6 cm long, with few yellowish-brown scales; petiole 23-47 cm long, 2-3 mm wide at apex, adaxially concave, with deciduous, yellowish-brown scales, abaxially convex; rachis 4.5-8 cm long, adaxially acute, glabrous, abaxially with deciduous, flattened yellowish-brown scales; leaf blade simple or divided in one or both sides in up to 2 pinnae, 0.7-1.4 times as long as wide, bifid at apex in 70-77% of its length, simple leaves with the segments oblong-lanceolate, acute to acuminate, 22-25 x 3.5-5 cm, forming an angle of ca. 50-60°, divided leaves with falcate to sigmoid pinnae 21-23 x 3.5-5 cm, separated 2-4 cm at the insertion; primary veins 11-15 on each side, forming an angle of 18-58° with the rachis, prominent and acute on both sides, with deciduous scales abaxially; secondary veins impressed adaxially, prominent and scaly abaxially, the surface papiraceous, glabrous. Inflorescence interfoliar, spicate, dark red in fruit; peduncle 7.5-8 cm long, 4-5 mm diameter, covered with small, yellowish-brown, deciduous scales; prophyll 4.5-5 x 1.2-1.5 cm, membranaceous to subcoriaceous, thin, striate, with yellowish-brown scales; peduncular bract similar to the prophyll, inserted 1.5-2 cm above the prophyll insertion, 3.5-4.5 cm long, almost enclosed by the prophyll or exceeding it for less than 1 cm; spike 17-20 cm long, 2-3 mm diameter, folded and twisted in bud, not cylindrical but narrowed between the distant flowerpits, smooth, with few elongated, appressed, yellowish-brown scales, at the apex with a slender point up to 1 cm long; pits bilabiate, 2-3 mm wide, spirally and loosely arranged, almost decussate at the middle, the pits of each row separated 6-8 mm; lips strongly projected up to 2 mm beyond the spike surface, upper lip emarginate, lower lip conspicuously bifid. Staminate flowers ellipsoid-obovoid, ca. 4 mm long; sepals elliptic-lanceolate, 4-4.5 mm long, acute, carinate to subcarinate; petals elliptic, ca. 4 x 2 mm, acute, thick; stamens 6, filaments connate for ca. 2 mm at base; anthers 2-2.5 mm long, strongly reflexed from the filaments; pistilode 1-1.5 mm long, deeply trifid. Pistillate flowers ovate-ellipsoid, ca. 5 mm long; sepals 3.5-4 mm long, acute, carinate; petals 4-4.5 mm long, acute, connate for 2 mm at base; staminodial tube ca. 4 mm long, truncate to slightly dentate; pistil ovate-elongate. Fruits ellipsoid, acute at apex, 8-9 x 6-7 mm, black, the surface with minute and elongate tubercles.

Distribution and habitat. Known only from the type locality, a very wet premontane forest on steep slopes on the eastern slope of the Andes in Colombia.

Etymology. *Geonoma wilsoni* is named after the student of biology Wilson Mario Malagón, who studied the palm flora on the eastern slopes of the Andes near Florencia, a research that led to the discovery of the new species.

Comments. This species is completely different from any other species of *Geonoma*, on account of its leaf blade deeply bifid, wider than long or scarcely longer than wide, simple or with up to two pinnae on a short rachis, and its long spicate and loosely pitted inflorescence. In Wessels Boer's (1968) treatment of the Geonomoid palms the new species cannot be keyed out. The most similar species is *G. arundinacea* Mart., which resembles *G. wilsoni* only in its inflorescence. Although inflorescences of *G. arundinacea*, as circumscribed by Henderson (1995) are variable, those of some specimens, e. g., the type (pl. 218 in Dahlgren 1959), Martius's (1823) plate, *J. Torres et al. 9994* (COL), resemble inflorescences of *G. wilsoni* in size and in the arrangement and shape of the flower pits, and shape and size of the prophyll and the peduncular bract. However *G. arundinacea* has smaller pits (up to 2 mm vs. 2-3 mm), and smooth fruits (vs. with

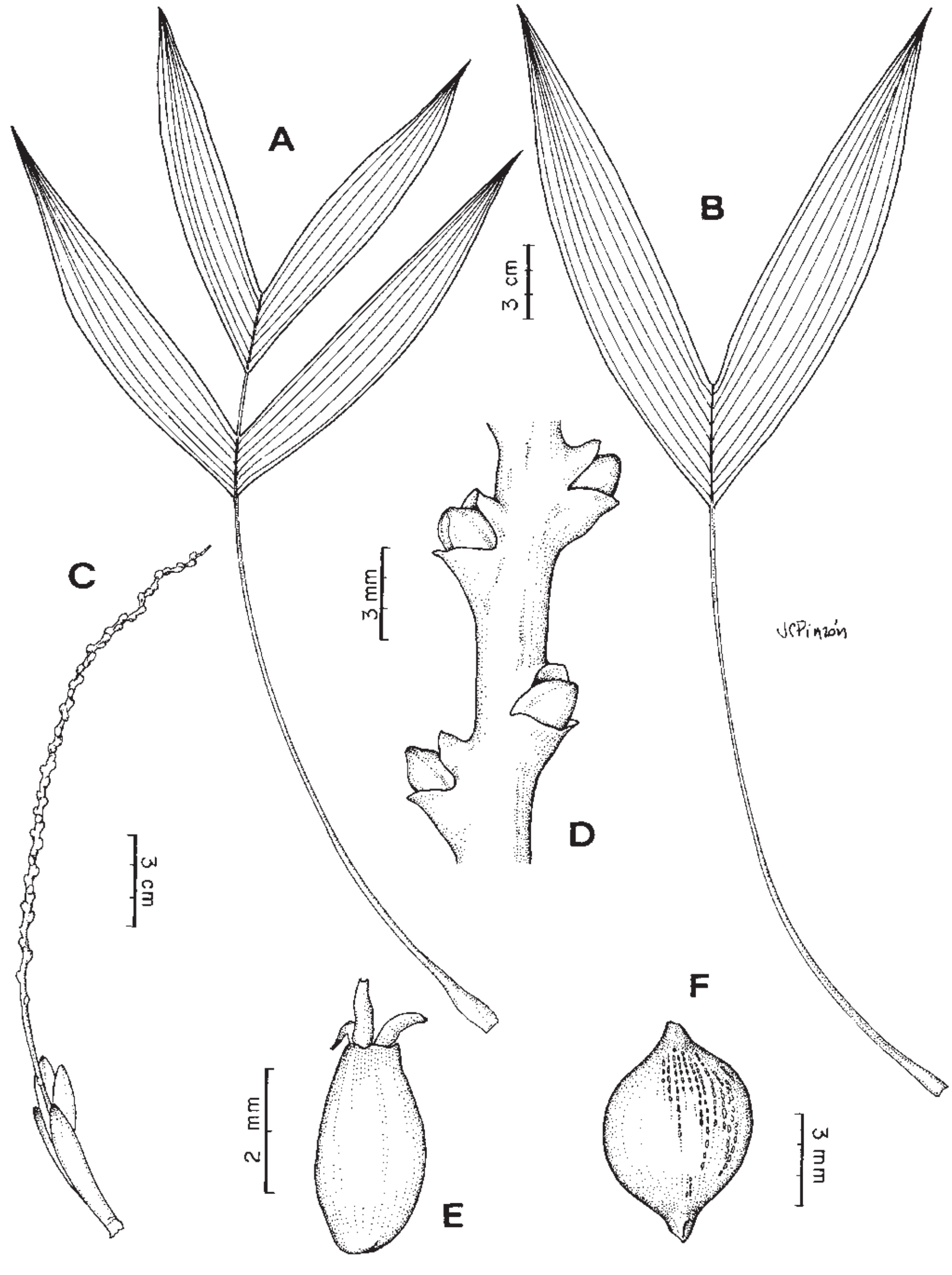
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Figure 4. *Geonoma wilsoni* Galeano & R. Bernal. A. Pinnate leaf. B. Simple leaf. C. Inflorescence. D. Detail of rachilla. E. Staminodial tube. F. Fruit (A, from *Bernal & Malagón 2901*; B-F, from *Bernal & Malagón 2900*).

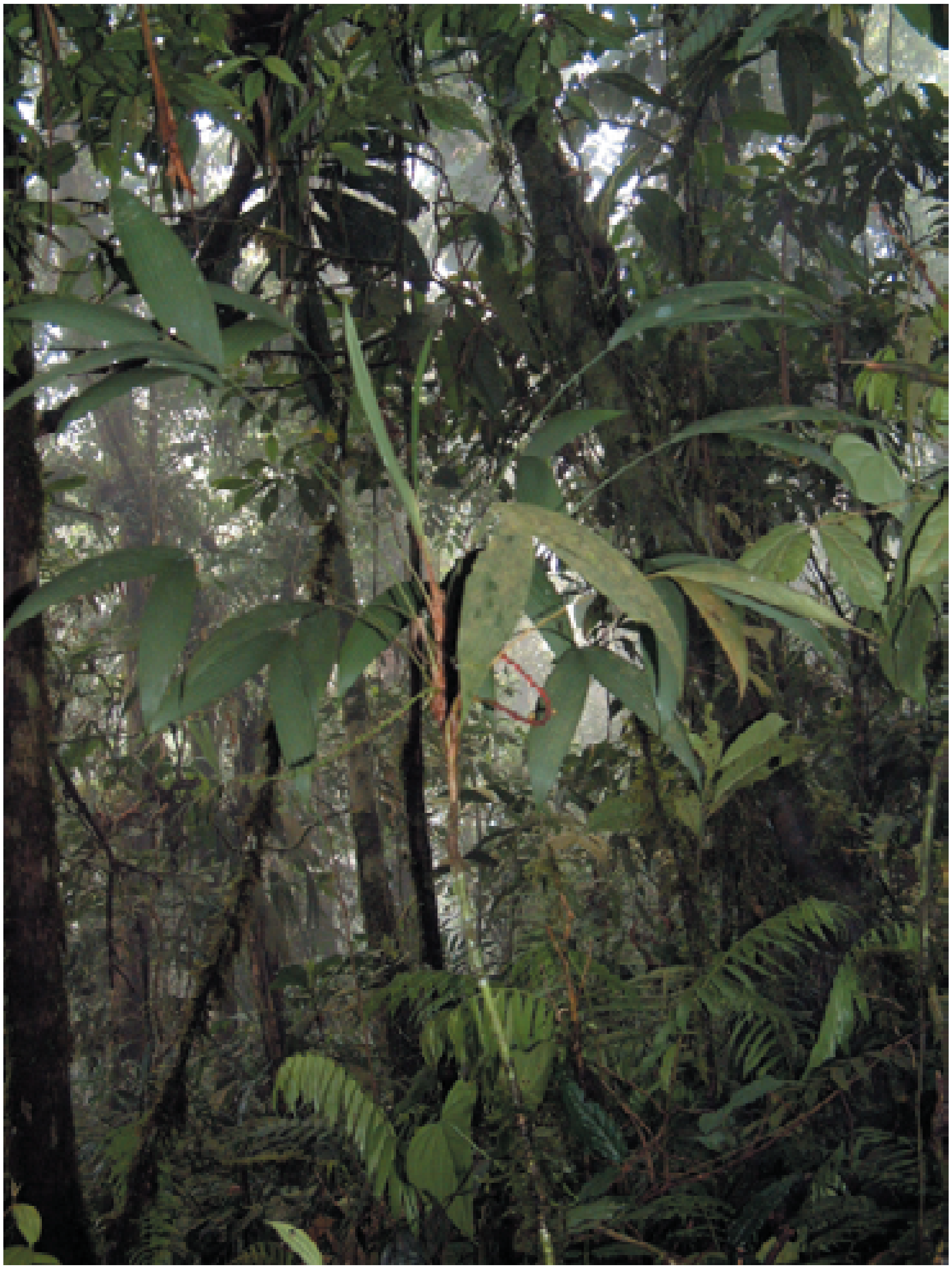

Figure 5. *Geonoma wilsoni.* Habit at the type locality (Photo: R. Bernal)

minute and elongate tubercles). On the other hand, the two species are completely different vegetatively. *G. arundinacea* is cespitose (vs. solitary) and has leaf blades oblong to oblong-obovate, 2.2-2.5 times as long as wide (vs. blade obovate to oblate in profile, 0.7-1.4 times as long as wide), bifid at apex in 23-37% of its length (vs. bifid in 70-77%), with 16-23 primary veins (vs. 11-15).

Additional specimens examined. COLOMBIA. **Caquetá**: Municipio de Florencia, Florencia-Suaza road, km 35, vereda Las Brisas, 1° 44' N, 75° 44' W, 1600-1700 m, 8 Aug 2001, *R. Bernal & W. Malagón 2901* (COAH, COL, HUA, K, PSO, QCA).

Aiphanes simplex Burret, Notizbl. Bot. Gart. Berlin-Dahlem 11: 567. 1932.

This species, endemic to Colombia, was known only from the río Cauca basin, and from some isolated populations on the western slopes of the Western Cordillera in Antioquia and Valle, where the mountain chain has elevations lower than 2000 m (Borchsenius & Bernal 1996). Recent exploration of the Eastern Cordillera has revealed its occurrence at two localities, in Caquetá and Santander, separated from each other ca. 550 km. Comparison of specimens from both localities with specimens of *A. simplex* from the basin of río Cauca leaves no doubt as to their identity. There are, however, some differences that are worth being discussed.

First, in the specimens from the Eastern Cordillera, the bracts subtending the flower triads are short, with smooth margins, and they do not cover the pistillate buds. Most specimens from the río Cauca basin have large bracts, with spinulose margins, that cover the pistillate bud almost completely. But even within the specimens of *A. simplex* treated by Borchsenius & Bernal (1996) there is variation in this character. One of the specimens with branched inflorescence collected on the western slopes of the Western Cordillera (*Idrobo & Fernández 198*, COL) also has poorly developed bracts, reminiscent of those found in some specimens of *A. erinacea* (Karst.) H. Wendl.

Second, in the specimens from Santander the staminate flowers of each triad are arranged perpendicular to the axis, so that flowers appear triangular and compressed from above. In all other specimens, both from the río Cauca basin and from the population in Caquetá the staminate flowers in each triad are appressed to the rachilla axis and they are elongate. The significance of this variation in respect to pollinators cannot be ruled out. Otherwise, floral morphology is similar in plants from the three localities, except for a greater density of spinules on the inflorescence axes of plants from Caquetá.

Third, plants from Santander have a solitary and thicker stem, whereas stems in the palms from Caquetá are cespitose and thin, like in plants from the río Cauca Basin. The yellowish spines on the leaf sheath and the petiole, which are so characteristic of *A. simplex* in the río Cauca basin do not occur on the plants from Santander, and they are only occasionally present on individuals from Caquetá.

Finally, the number of pinnae of plants from Caquetá (15-22 per side) is larger than the range so far known for *A. simplex* (9-16).

Aiphanes simplex was considered by Borchsenius & Bernal (1996) as closely related to *A. erinacea*, and these authors suggested that specimens of *A. simplex* with a branched inflorescence might represent a transition between both species. As *A. erinacea* grows also on the western slopes of the Andes in Ecuador, the finding of *A. simplex* farther north on the same slope is an additional evidence of the continuous distribution of both species, suggesting that *A. simplex* might be only a reduced form of *A. erinacea* on the northern portion of its range. Collections from the Amazonian slopes of the Andes near the border between Colombia and Ecuador would help to understand the pattern of variation in this complex.

Examined specimens. COLOMBIA. **Caquetá**: Florencia, Florencia-Suaza road, km 28, vereda Las Brisas, 1°42' N, 75°43' W, 1500 m, 6 Aug 2001, *R. Bernal & W. Malagón 2882* (AAU, COAH, COL, HUA); 7 Aug 2001, *R. Bernal & W. Malagón 2892* (COL); km 35, 1°44' N, 75°44' W, 1600-1700 m, 8 Aug 2001, *R. Bernal & W. Malagón 2903* (COL, MO). **Santander**: Suaita, San José de Suaita, ca. 6º 10' N, 73º 27', 1700-1900 m, 30 Jul 2001, *G. Galeano et al. 6883* (AAU, COL, HUA, K, NY, UIS).

Attalea cohune Mart., Palmet. Orbign. 121. 1844.
Orbignya cohune (Mart.) Dahlgren ex Standley, Trop. Woods 30: 3. 1932.

The occurrence of a species of *Attalea* in the middle Magdalena valley had been suggested already by Ranghel-Galindo (1941), who even indicated that someone else had identified it as *Attalea cohune*, an identification he mistrusted. However, no specimens had ever been available for identification, and this species was not included by Dugand (1940, 1976) or by Henderson et al. (1995) in their checklists of the palms of Colombia. Henderson et al. (1995) did suggest (p. 159), based on field observations by Bernal and Galeano, that *Attalea cohune* apparently occurs in the Magdalena valley. Glassman (1999) did not record this species (which he treated under *Orbignya*) south of Nicaragua. Morcote & Bernal (2001) cited archaeological remains of this species in Colombia, but did not discuss its present occurrence.

The specimens cited below confirm that the palm discussed by Ranghel-Galindo (1941) is indeed *Attalea cohune*. There are virtually no differences between these specimens and those described by Glassman, although the South American populations are separated from those of Central America by a gap of about 1300 km in Costa Rica and Panama, where the species has not been found.

Attalea cohune grows from near La Dorada north to at least Puerto Boyacá, but it may reach further north in the valley. It grows mainly on hilly terrain, and is replaced on the lowlands by *Attalea butyracea*.

Specimens examined. COLOMBIA. **Boyacá**: 16 km beyond Puerto Boyacá, 370 m, s. d. (ca. 1997), *A. Duque et al. 61* (COL, HUA). **Caldas**: 13 km N of La Dorada, on road to San Miguel, 330 m, 7 Mar 1977, *A. Gentry et al. 18205* (MO); Municipio de Norcasia, río La Miel, 2 km below confluence with río Manso, 5° 40' N, 74° 45' W, 160-200 m, 19-21 May 2001, *R. Bernal & P. Lopera 2793* (COL, FAUC, NY).

Attalea phalerata Mart. ex Spreng., Syst. veg. 2: 624. 1825.

This species is widespread throughout the periphery of the Amazon (Henderson 1995), but had not yet been recorded in Colombia. It is common in varzea areas near Mocagua, at the Amacayacu National Park, where it is known by the common name c*hapaja* (or c*hapaja de bajo*, when it needs being contrasted with the other c*hapaja*, *Attalea plowmanii*, which grows on terra firme).

Specimen examined. COLOMBIA. **Amazonas**: Parque Nacional Natural Amacayacu, forest behind the visitors center at Mocagua, 3° 49' S, 70° 55' W, 118 m, 26 Aug 2001, *R. Bernal & M. Gruezmacher 2929* (COL, HUA, NY).

Attalea plowmanii (Glassman) Galeano & Bernal, comb. nov.
Scheelea plowmanii Glassman, Illinois Biological Monographs 59: 144. 1999. Type: Peru, Loreto, prov. Maynas, Rio Yaguasyacu, Brillo

Nuevo, Apr 1977, *Plowman 6778* (holotype, BH ; isotypes, GH, USM).

This species was treated by Henderson (1995) and Henderson et al. (1995) as a form of *A. butyracea* with a subterranean stem, although these authors suggested that the plants might indeed represent an undescribed species. The available specimens were thereafter described by Glassman (1999) as a new species of *Scheelea*, one of the four genera accepted by him in the subtribe Attaleinae. These four genera (*Attalea sensu stricto*, *Scheelea*, *Orbignya* and *Maximiliana*) were recognized by most authors during the 19th and 20th centuries, and were separated by characters of the staminate flowers. However, Henderson and Balick (1991) showed that there are at least eight types of staminate flowers and many intermediate forms, and they accepted only one genus, *Attalea sensu lato*, as had been already proposed by Wessels Boer (1965). The documented cases of hybridization in the group (e. g., Balick et al. 1987a, 1987b) support this view, which has been followed by other recent authors (e. g., Borchsenius et al. 1998, Moraes 1999, Stauffer 2000; but see Kahn 1997, de Granville 1999). We also recognize a single genus, and are therefore tranferring this species to *Attalea sensu lato*.

Attalea plowmanii has been recorded in Colombia along the Amazon river and at the Mirití Paraná, in the area of the middle Río Caquetá. Along the Colombian Amazon, this palm is a common and sometimes abundant element of the forest understory.

Specimens examined. COLOMBIA. **Amazonas**: río Guanganai, a tributary of the Amazon 500 m below Zaragoza, forest ca. 3 km upriver from the mouth, 3° 55' S, 70° 09' W, ca. 150 m, 3 Mar 2001, *R. Bernal et al. 2525* (COL, HUA, NY); Parque Nacional Natural Amacayacu, forest platform at Bacaba, 3° 47' S, 70° 15' W, 120 m, 31 Aug-2 Sep 2001, *R. Bernal & M. Gruezmacher 2931* (COL, HUA, NY); ca. 15 km N of Macedonia on río Amazonas, Caranazal, 3° 49' S, 70° 09' W, 100 m, 5 Sep 2001, *R. Bernal et al. 2954* (COL); río Caquetá, near Chorro Córdoba, terra firme forest, 250 m, 12 Mar 1990, *G. Galeano et al. 2050b* (COL, NY).

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LITERATURE CITED

Balick, M. J., C. Pinheiro & A. B. Anderson. 1987a. Hybridization in the Babassu palm complex: I. *Orbignya phalerata* x *O. eichleri*. American Journal of Botany 74: 1013-1032.

Balick, M. J., A. B, Anderson & J. T. Madeiros-Costa. 1987b. Hybridization in Babassu Palm Complex. II *Attalea compta* x *Orbignya oleifera* (Palmae). Brittonia 39: 26-36.

Borchsenius, F. & R. Bernal. 1996. *Aiphanes* (Palmae). Flora Neotropica Monograph 70: 1-94.

Borchsenius, F., H. H. Borgtoft Pedersen & H. Balslev. 1998. Manual to the Palms of Ecuador. AAU Reports 37: 1-217.

Dahlgren, B. E. 1959. Index of American palms – plates. Field Museum of Natural History, Botanical Series 14: pl. 1-412.

de Granville, J. J. 1999. Palms of French Guiana: diversity, distribution, ecology and uses. Acta Botanica Venezuelica 22: 109-125.

de Nevers, G. & M. Grayum. 1998. Notes in *Geonoma* in Mesoamerica. Principes 42: 94-103.

DUGAND, A. 1940. Palmas de Colombia. Clave diagnóstica de los géneros y nómina de las especies conocidas. Caldasia 1: 20-84.

DUGAND, A. 1976. Palmarum colombiensium elenchus. Cespedesia 5 (19-20): 257-336.

ESLAVA RAMÍREZ, J. E. 1994. Climatología del Pacífico colombiano. Academia Colombiana de Ciencias Geofísicas, Colección Eratóstenes, No. 1, Bogotá.

GLASSMAN, S. F. 1999. A taxonomic treatment of the palm subtribe Attaleinae (Tribe Cocoeae). Illinois Biological Monographs 59: 1-414.

HENDERSON, A. 1995. The Palms of the Amazon. Oxford University Press, New York.

HENDERSON, A. 2000. *Bactris* (Palmae). Flora Neotropica Monograph 79:1-181.

HENDERSON, A. & M. J. BALICK. 1991. *Attalea crassispatha*, a rare and endemic Haitian palm. Brittonia 43: 189-194.

HENDERSON, A., G. GALEANO & R. BERNAL. 1995. Field Guide to the Palms of the Americas. Princeton Univesity Press, Princeton, New Jersey.

IGAC (Instituto Geográfico Agustín Codazzi). 1977. Zonas de Vida o Formaciones Vegetales de Colombia. Instituto Geográfico Agustín Codazzi, Bogotá.

KAHN, F. 1997. The palms of El Dorado. Orstom/Champflour/The International Palm Society, Marly-le-Roi, France.

MARTIUS, C. 1823. Historia Naturalis Palmarum vol. 2. Genera et Speciei. T. O. Weigel, Leipzig.

MORAES R., M. 1999. Fitogeografía de palmeras en tierras bajas de Bolivia. Acta Botánica Venezuelica 22: 127-140.

MORCOTE, G. & R. BERNAL. 2001. Remains of palms (Palmae) at archaeological sites in the New World –A review. The Botanical Review 67: 309-350.

RANGHEL-GALINDO, A. 1941. Informe del inspector de bosques nacionales. Tierras y Aguas (Bogotá) 4(25): 5-32.

STAUFFER, F. W. 2000. Contribución al estudio de las palmas (Arecaceae) del estado Amazonas, Venezuela. Scientia Guaianae 10: 1-197.

WESSELS BOER, J. G. 1965. Palmae. Flora of Suriname 5(5): 1-172.

WESSELS BOER, J. G. 1968. The Geonomoid Palms. Verhandelingen der Koninklijke Nederlandsche Akademie van Wetenschappen. Afdeeling Natuurkunde; Tweede Sectie 2, 58: 1-202.

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